

UNITED STATES MARINE CORPS
Basic Officer Course
The Basic School
Marine Corps Combat Development Command
Quantico, Virginia 22134-5019

B2159

HEAVY MACHINE GUNS 1

Student Handout

1. General Characteristics, Data and Capabilities of the M2 .50 Caliber Machine Gun

a. Characteristics. The M2 .50 caliber machine gun is a belt-fed, recoil-operated, air-cooled, crew-served machine gun.

b. Data

- Weights

M2	Machine gun (less barrel)	60 lbs
	Barrel	24 lbs
M3	Tripod w/T&E and pintle	44 lbs
TOTAL WEIGHT:		128 lbs

c. Capabilities

(1) The weapon can deliver both single-shot and automatic fire.

(2) Ranges

Maximum: 7400 meters
Maximum effective: 1830 meters
Grazing fire: 1000 meters

(3) Rates of fire

Sustained: 40 rds or less per minute
Rapid: 40 rds or more per minute
Cyclic: 450-550 rds per minute

(4) Muzzle velocity: 3050 feet per second

(5) Ammunition

<u>Type</u>	<u>Identifier</u>		
M2	Dummy	Plain; holes in cartridge	
M1, M1A1	Blank	No bullet	
M2, M33	Ball	Plain	
M1, M10, M17	Tracer	Red, orange, or brown tip	
	M1, M23	Incendiary	Blue tip
M2	Armor piercing	Black tip	
M8	Armor piercing incendiary	Aluminum tip	
M20	Armor piercing incendiary tracer	Aluminum tip w/red ring	
M903	(SLAP) Saboted light armor penetrating plain	Plastic sleeve	

2. Six Main Groups of the M2 .50 Caliber Machine Gun (See Figure 1.)

a. Barrel group

- b. Backplate group
- c. Bolt group
- d. Barrel buffer group
- e. Barrel extension group
- f. Receiver

group

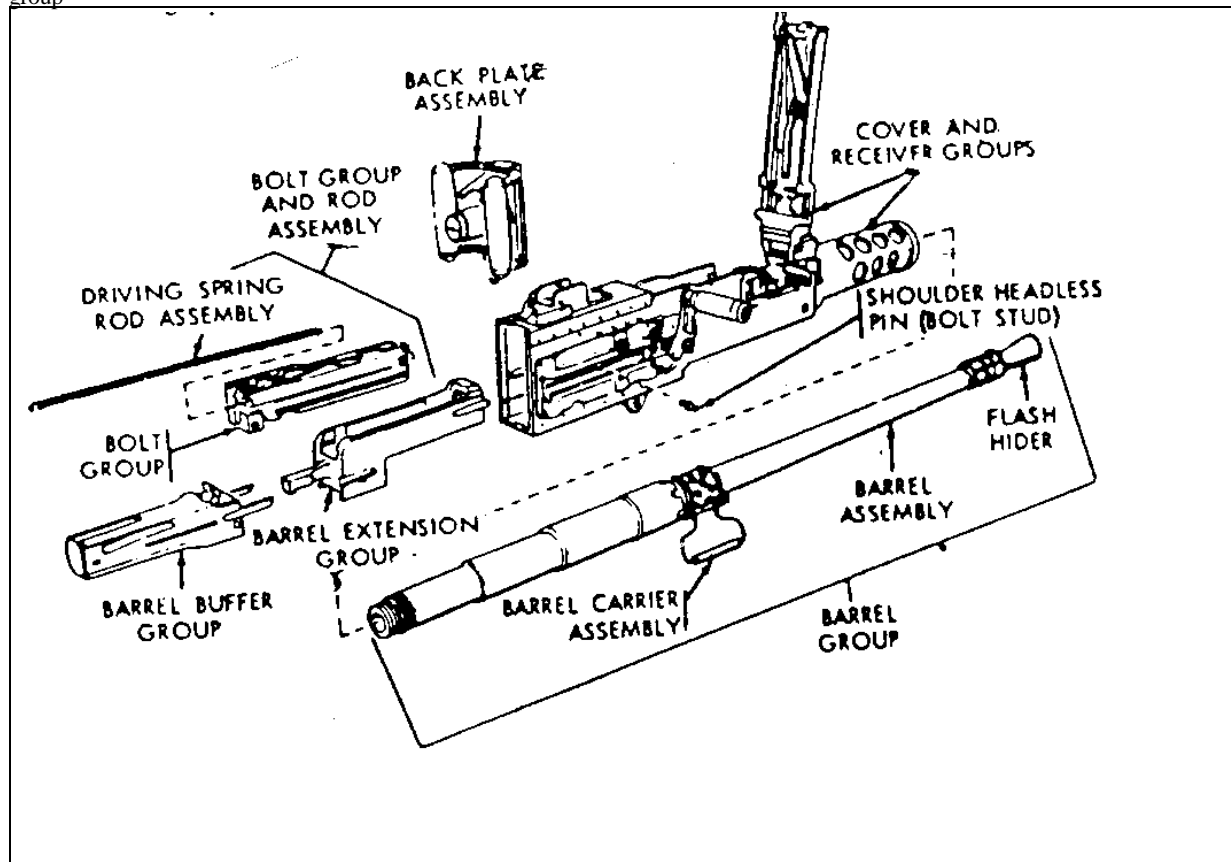


Figure 1. Six main groups

3. **Headspace and Timing**

a. Definition. Headspace is the distance between the face of the bolt and the base of the cartridge case when it is fully seated in the chamber. The headspace is always set prior to firing the gun. The headspace and timing gauge is used to adjust the headspace and timing.

b. Definition. Timing is the adjustment of the weapon so that firing takes place just before the recoil parts are fully forward. When the gun fires on the FIRE gauge and does not fire on the NO FIRE gauge, we have correct timing. Timing must be checked and set each time headspace is set.

4. **Loading (two methods)** (Before touching any weapon, make sure it is a complete safe weapon):

a. As described in FMFRP 6-15 and B2161.

b. As described below. THIS IS THE ONLY METHOD TO BE USED WHILE AT TBS!

(1) With bolt forward, raise cover, raise extractor arm.

(2) Place rounds against cartridge stop, double loop first, with rough side down.

(3) Lower extractor arm between first and second round.

(4) Close cover. (Weapon is now at "HALF LOAD.")

(5) Cock weapon, ensuring the bolt returns fully forward. (Weapon is now at "FULL LOAD.")

5. **Firing**

a. Single shot

b. Automatic - 6-9 round burst

c. No safety

6. **Unloading**

a. Unlock bolt latch release (if applicable).

b. Raise the cover.

c. Remove ammunition from feedway.

d. Pull and lock bolt to the rear.

e. Examine chamber and T-slot in face of bolt to ensure they hold no ammunition.

7. **Clear Gun**

a. Unlock the bolt latch release.

b. Raise the cover.

c. Remove any ammunition from feedway.

- d. Pull and lock the bolt to the rear.
- e. Examine the chamber and T-slot in face of bolt to ensure they hold no ammunition.
- f. Place clearing block inside receiver.
- g. Run cleaning rod through chamber.

8. **Immediate Action**

- a. Wait 5 seconds. (A hangfire may be causing the misfire.)
- b. Within the next 5 seconds, to guard against cook-off, pull the bolt to the rear and check for ejection and feeding. If there is ejection and feeding, continue to "c." If there is no ejection, immediately determine if it is a hot or cold barrel. If it is hot, see "CAUTION." If it is cold, attempt to clear weapon.
- c. Release the bolt, allowing it to move forward.
- d. Relay on target and attempt to fire.
- e. If the weapon again fails to fire, wait 5 seconds, open the cover and remove ammunition, pull and lock bolt to the rear.

CAUTION. If the barrel is hot (more than 150 rounds fired within 2 minutes prior) and the round cannot be extracted within 10 seconds, it must remain in the chamber (cover closed) for at least 5 minutes to guard against cook-off.

9. **Malfunctions.** As with the M60 machine gun the M2 has two types of malfunctions.

- a. Sluggish operation. Can be caused by:
 - (1) Lack of lubrication,
 - (2) Poor headspace adjustment, and/or
 - (3) Incorrect timing.
- b. Runaway gun. Can be caused by
 - (1) Bent trigger lever, and/or
 - (2) Burred or beveled surfaces of the trigger lever and sear.
- c. To stop a runaway gun
 - (1) Keep the machine gun laid on target.
 - (2) Twist the belt of ammunition so that the weapon jams. (This may damage the feeding mechanism.)
 - (3) Break the ammunition belt.
 - (4) CAUTION. DO NOT UNLATCH THE COVER!!
- d. To repair a runaway gun replace appropriate broken, worn, or burred parts.

10. **Mounts.** The M2 machine gun can be mounted on a variety of mounts, depending upon the mission.

- a. Ground mounts
 - (1) Tripod Mount, M3
 - (a) The tripod mount is the principal ground mount and is used against ground targets.

(b) The mount is nearly identical to the M122 tripod used with the M60 machine gun, except for size.

Weight: 44 lbs (approx)
Height: 14 in.
Traversing range: 45 degrees
Maximum elevation: +5.6 degrees
Maximum depression: -14 degrees

(2) Antiaircraft Mount, M63. The M63 mount is the principal antiaircraft mount for the M2 machine gun.

Weight: 144 lbs.
Height: 42 in.
Diameter at base: 52 in.
Traversing range: 360 degrees
Maximum elevation: +85 degrees
Maximum depression: -29 degrees

b. Vehicle mounts

(1) Truck Mount, M36

(a) The M36 is used to mount the M2 machine gun on cargo and transport trucks in units such as artillery, engineer and motor transport.

(b) The M36 mount provides limited elevation capability, but can be traversed through 360 degrees, provided the gunner moves carefully.

(2) HMMWV weapons platform. Primary wheeled vehicle mount for offensive employment of the M2 machine gun within the infantry division. The M2 machine gun is mounted directly to the HMMWV pedestal using a pintle.

11. **Location.** There are six M2 .50 caliber machine guns in the heavy machine gun platoon of the weapons company of the infantry battalion. They are organized into three sections of two squads each, as shown in Figure 2.

Figure 2. Location

12. General Characteristics, Data, and Capabilities of the MK19 40mm Machine Gun

- a. Characteristics. The MK19 MOD 3, 40mm machine gun is an air-cooled, blowback-operated, fully automatic weapon. (See Figure 3.)

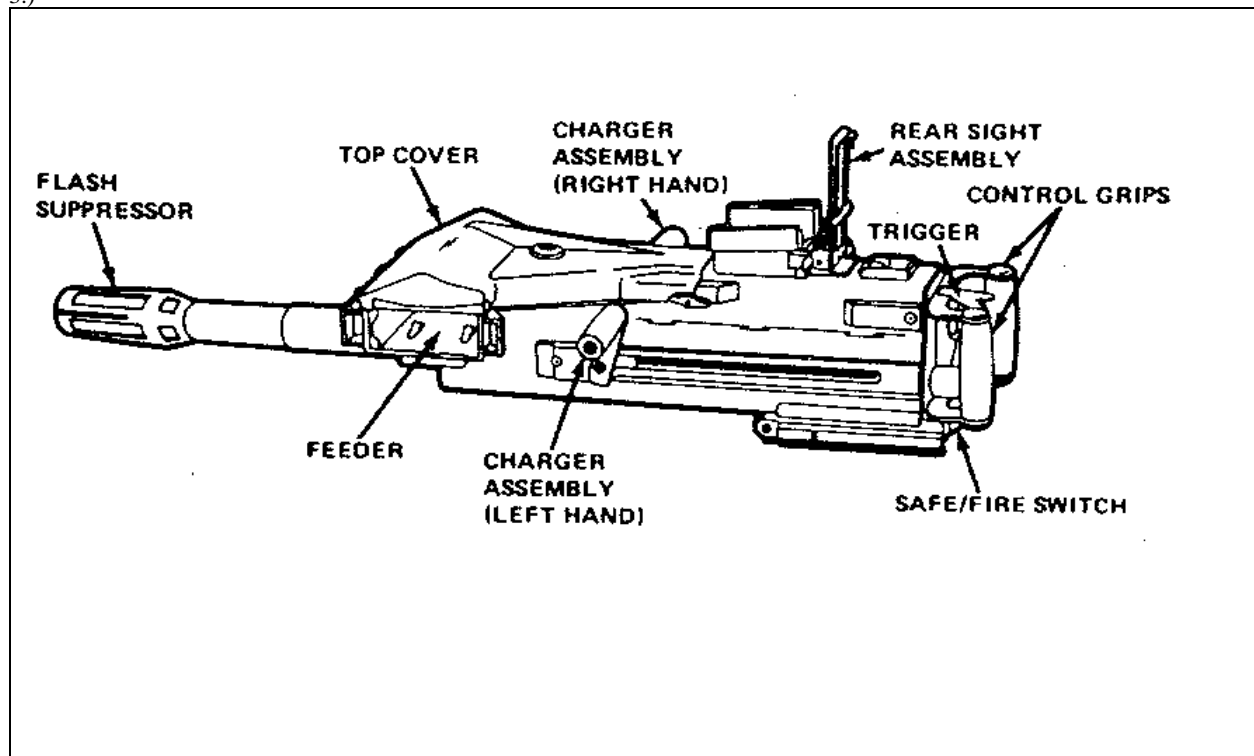


Figure 3. MK19 MOD 3 machine gun

b. DataWeights

MK19 machine gun	75.6 lbs
MK64 cradle	21 lbs
M3 tripod	44 lbs

TOTAL WEIGHT: 140.6 lbs

c. Capabilities

(1) There is no selector switch for semiautomatic fire, but it can be achieved by proper trigger manipulation.

(2) Ranges

Maximum:	2200 meters
Maximum effective:	1500 meters
Minimum safe distance:	Training - 310 meters
Minimum safe distance:	Combat - 75 meters

(3) Rates of fire

Sustained:	40 rds per minute (3 to 5 rd burst)
Rapid:	60 rds per minute
Cyclic:	325-375 rds per minute

(4) Muzzle velocity. 790 feet per second

(5) Ammunition. Approximately one inch of the round casing is not in the barrel when fired - the casing serves as its own chamber.

(a) M922 dummy

1 Used for crew training and to check weapon function.

2 Ten round link belt.

3 Holes in cartridge base.

4 Yellow ogive.

(b) M385 TP, target practice

1 Normal propellant charge; non-explosive warhead (arch).

2 Ballistically simulates M383 and M384 HE rounds.

3 Blue ogive with black markings.

4 50 rounds per container.

5 53 lbs per container.

(c) M383 and M384 HE, high explosive

1 _____ Yellow arch and markings2 _____ Arming distance: 18-36 meters3 _____ ECR: 15 meters4 _____ 48 rounds per container (M383)5 _____ 50 rounds per container (M384)6 _____ 59.5 lbs per container

(d) M430 HEDP, high explosive dual purpose

1 _____ Yellow arch and markings2 _____ Arming distance: 18-36 meters3 _____ ECR: 15 meters4 _____ 48 rounds per container5 _____ 59.5 lbs per container

CAUTION: Ammunition for the MK19 and M203 is NOT interchangeable!

13. **Five Major Assemblies** (See Figure 4.)

a. Receiver assembly (1)

b. Feed slide assembly and feed tray (2)

c. Top cover assembly (3)

d. Sear assembly (4)

(5) e. Bolt _____ and _____ backplate _____ assembly

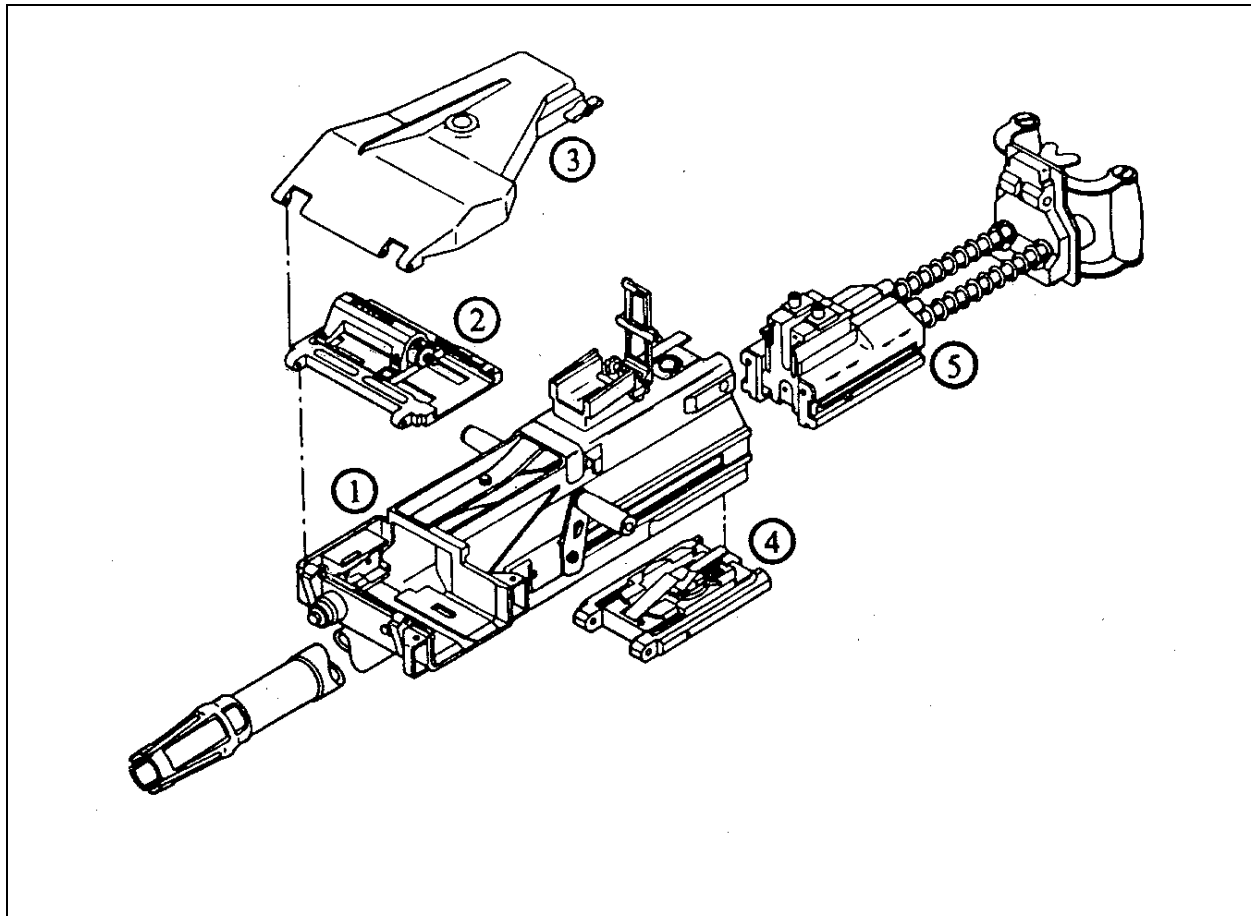


Figure 4. Five major assemblies

14. **Prepare for Firing**

a. Loading. Loading begins with the bolt forward, safety on "S" (safe) and cover open.

(1) Insert the first round into the feedway, female link first. (See Figure 5.)

(2) Push the round across the first feed pawl. Don't roll the round!

(3) Move the feed slide assembly to the left and close the cover.

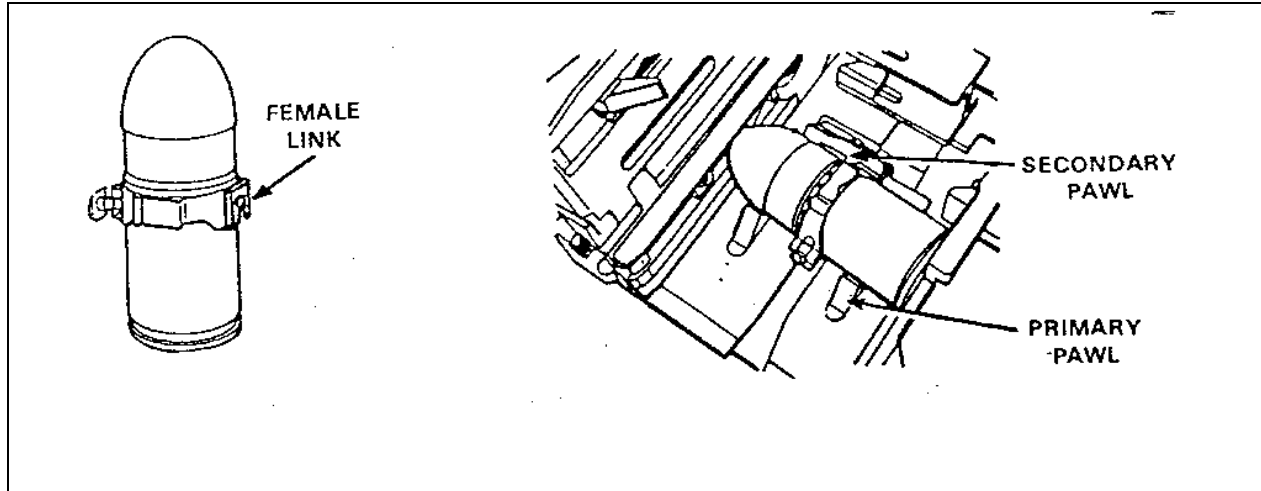


Figure 5. Loading

b. Charging. After the weapon is loaded, it must be charged to place the first round in the correct position so it may be fired.

- up and in.
- (1) Grasp the charging handles (see Figures 6, 1) and press the charger handle locks (see Figures 6, 3)
 - (2) Rotate the handles down and pull to the rear.
 - (3) Press the locks and push the charging handles forward and up to the original position.
 - (4) Place the safety on "F" (fire) and press the trigger. Do NOT ride the bolt forward.

- (5) Pull the charging handles to the rear, press the locks and push the handles forward once again.
- (6) Place the safety on "S" (safe). The weapon is loaded and charged.

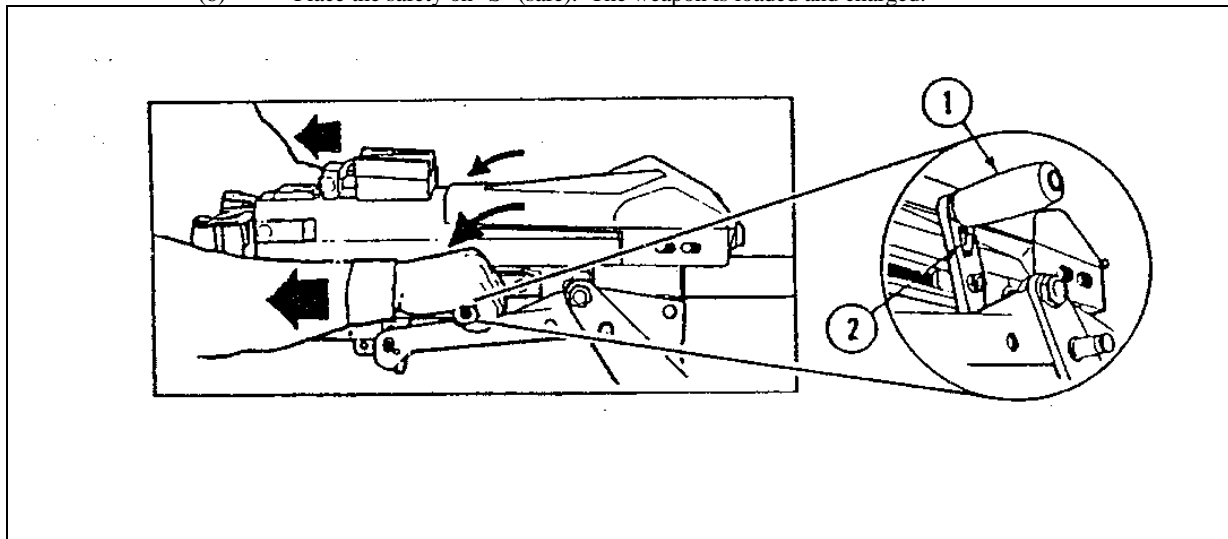


Figure 6. Charging

CAUTION: During charging, if the bolt cannot be pulled fully to the rear, i.e., doesn't lock, then while you raise the cover to clear the gun and realign the primary and secondary drive levers, you must maintain rearward pressure on the charger assemblies to prevent the possibility of the bolt flying home once the cover is raised. Such action could result in a live round being fired with the cover raised! Serious injury could result.

c. Firing

- (1) To fire the MK19:
 - (a) Place the safety on "F" (fire).
 - (b) Ensure the charging handles are forward and up.
 - (c) Place hands on grips with thumbs on trigger.
 - (d) Fire 3 to 5 round burst.
- (2) To field zero the MK19:

- (a) Locate a target approximately 400 meters away.
- (b) Set range on sight to 400, windage to zero.
- (c) Use the T&E to aim at the target.
- (d) Fire a 2 to 5 round burst.
- (e) Without moving the weapon (do not adjust the T&E) adjust the sights to aim at the point where the rounds hit.
- (f) Repeat steps (d) and (e) as necessary until point of aim equals point of impact.

(3) The MK19 machine gun's counter-recoil system causes the weapon to move down after the firing. As a result, the second round of a burst will usually be lower than the initial round.

(4) The T&E mechanism used with the MK19 functions the same way as the M60 and M2 T&Es - remember PUSH RIGHT UP.

15. Clearing Procedures

- a. Pull the bolt to the rear.
- b. Return charging handle forward.
- c. Safety on "S" (safe).
- d. Raise cover and inspect the chamber.
- e. Safety on "F" (fire).
- f. Ride the bolt to the forward position.
- g. Place weapon on safe.

16. **Unloading.** Ensure that the bolt is to the rear, place the safety on "S" (safe), and then raise the cover.

- a. Using a cleaning rod, push the live round or spent casing off the face of the bolt.

CAUTION: Catch the live round as it falls out.

b. If belted ammunition remains in the feedway, reach beneath the feeder and press the primary and secondary positioning pawls while you slide the belt free. (See Figure 7.)

Figure 7. Removing belted ammunition

17. **Malfunctions.** Unlike the M60 and M2 machine guns, the MK19 has three types of malfunctions.
- a. Sluggish or erratic firing can be caused and corrected by:
 - (1) Dirty bore or chamber. Clean appropriate parts.
 - (2) Weak recoil springs or bent guide rods. Have ordnance personnel repair or replace.
 - (3) Timing out of adjustment. Have ordnance personnel test timing mechanism.
 - b. Runaway gun can be caused by either a damaged sear or defective trigger. To stop a runaway gun, lower one charging handle sharply and the weapon will stop firing. Do NOT attempt to break the belt.
 - c. Firing out of battery (or firing too soon) is an extremely dangerous malfunction. Indicated by smoke, flash, or powder blowback from bottom of gun. STOP FIRING IMMEDIATELY. Have ordnance personnel inspect the weapon.
18. **Immediate Action.** In the event of a stoppage, use the following procedures.
- a. Shout "MISFIRE."
 - b. Wait 10 seconds.
 - c. Pull bolt to the rear, team leader/A-gunner catch round as it is ejected and return the charging handles all the way forward.
 - d. Attempt to fire. If weapon still does not fire:
 - (1) Put safety on SAFE.
 - (2) Wait 10 seconds.
 - (3) Pull bolt to the rear. Catch round.
 - (4) Open cover and clear ammo - notify ordnance personnel.
19. **Operator Maintenance.** CLP is NOT an authorized cleaning agent for the MK19 machine gun.
- a. Clean all parts with RBC (Rifle Bore Cleaner) and lubricate with LSAT (Lubricant, Semi-Fluid, All-Temperature).
 - b. The one-in-forty-eight (1:48) right hand twist in the bore causes the barrel to self-tighten. A barrel wrench must be used to remove the barrel. The operator is NOT authorized to remove the barrel from the receiver.
 - c. The operator is NOT authorized to disassemble the bolt and backplate assembly.
20. **Mounts.** The MK64 gun cradle adapts the MK19 MOD 3 for use with the
- a. M3 tripod mount,
 - b. M36 truck mount, and
 - c. HMMWV weapons platform.
21. **Location.** There are six MK19 MOD 3s found in three sections of two squads each of weapons company's heavy machine gun platoon. Those squads can fire either their M2 HB .50 cal or their MK19 MOD 3 at any one time, but not both at the same time. An additional four MK19 MOD 3s are found in H&S company of the infantry battalion. (See Figure 2.)
22. **References**

- a. FMFRP 6-15 Machine Guns and Machine Gunnery
- b. TM 9-1005-213-10
- c. TM 08521A - 10/1A
- d. Infantry in Battle Ch. XVII

